BLASTOMYCOTIC LESIONS OF THE BRAIN[1]

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Mr. President and Gentlemen: Most of you are aware that there has been in process of birth not simply one disease due to blastomycetes but two. The affection of the skin, blastomycetic dermatitis you have probably heard most about, but because in the other affection, systemic blastomycosis, definite foci of blastomycosis have recently been found in the nervous system, your Secretary, Dr. Bassoe asked me to show you some preparations illustrating these observations. It has been my good fortune to hold post-mortem examinations upon three bodies of individuals dying of this generalized or systemic infection and I believe Dr. Bassoe has had two similar opportunities. Relatively few examinations of this sort have been made and in a number of instances the central nervous system evidently was not carefully examined, to judge by the published reports; therefore you will be interested in knowing that in two of the three post-mortem examinations I made, disseminated blastomycotic lesions were found in the brain.

Such lesions will undoubtedly be found in a considerable proportion of the systemic infections with blastomycetes if they are carefully sought.[1a] Krost, Stober and Moes[2] have reported their occurrence and previously Meyers and myself[3] described this large destruction of the cerebellum involving the entire outer half of the right lobe, measuring 4.5 cm. antero-posteriorly and laterally, 3.8 cm. vertically and extending to within 2 cm. of the median line (see Fig. 1). It is an irregularly shaped region the size of a pigeon's egg resembling roughly the so-called "solitary tubercle" of tuberculosis and apparently made up of agglomerated smaller nodules, some of which are slightly softened in their necrotic centers.

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[1] Demonstrated before The Chicago Neurological Society, October 22, 1908.

[1a] According to Dr. Stober, Resident Pathologist, there will be accounts of such observations in several cases in a forthcoming collection of reports from the Cook County Hospital, Chicago.

[2] Jour. Am. Med. Assn., 1908, 50, 184.

[3] Jour. of Inf. Dis., 1907, 4, 187.

That disseminated blastomycotic nodular lesions do occur in the brain in instances of the systemic infection and may be found, as already stated, if a careful search is made, is illustrated by our experience in the examination of the cerebrum accompanying this cerebellum.

At the time this cerebellar lesion (see Fig. 1) was examined the cerebrum was sectioned in the usual manner by frontal sections averaging 2 cm. apart and the examination of the surfaces so exposed failed to reveal any similar lesions. Subsequently to the report mentioned and before discarding the cerebrum, the segments already made were further subdivided by more frontal sections so that eventually parallel frontal surfaces 6 to 10 mm. apart from end to end of both hemispheres were inspected.

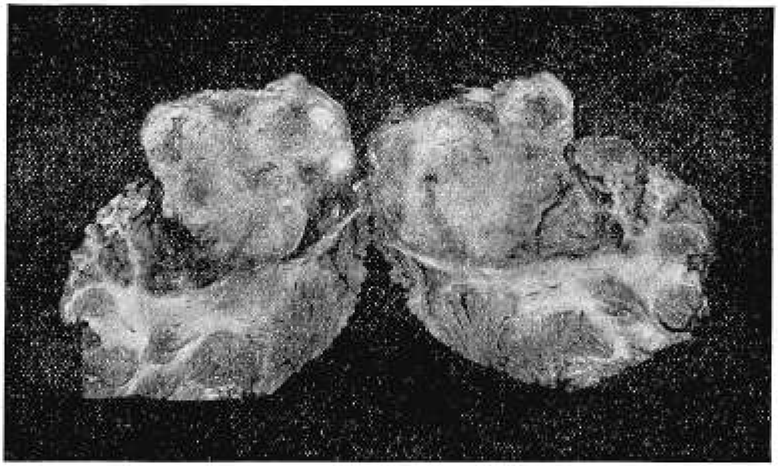

FIG. 1. Destruction of a large part of the right lobe of the cerebellum by blastomycosis; a large conglomerate nodule.

This further examination resulted in the discovery of this second lesion (See Fig. 2) a small region 8 by 10 mm. in the two long diameters exposed, evidently sectioned in the middle and located mainly in the internal capsule; the section which shows this lesion passes through the middle of the corpora mammallaria. With our experience limited as it was at this time, to the large cerebellar lesion, it is not surprising that this smaller lesion was overlooked in the customary and rather cursory first examination of the cerebrum.

That such smaller lesions of disseminated nodular blastomycosis should be carefully sought for in the brain was still more emphatically impressed upon us by the examination of the brain in the second case in which they were present, for in this instance they were more numerous, smaller and more widely scattered. A full report of the case has not as yet been published but you should know that the course of the disease was carefully studied, the diagnosis made early and that in other respects, especially the distribution of the lesions as they were revealed by the post-mortem examination, the disease in this instance corresponded well with systemic blastomycosis as we understand it.[4]

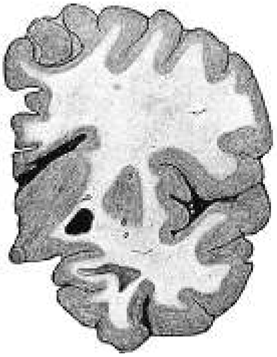

FIG. 2. Posterior surface of a section through the right hemisphere illustrating the location of a nodule in the internal capsule.

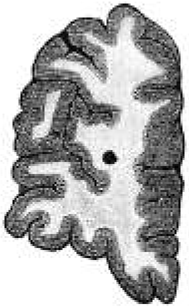

FIG. 3. Posterior surface of a vertical segment through the left hemisphere 2 cm. from the anterior pole. Lesion in the white substance of the left hemisphere.

The first frontal sections of the brain in this second case, numbering seventeen and dividing the brain into eighteen segments, revealed six lesions, four in the cerebrum and two in the cerebellum, and located as follows: One 2 cm. behind the anterior end of the left hemisphere, circular in shape, 2 mm. in diameter and 2 mm. beneath the gray substance of the cortex (see Fig. 3); a second in the gyrus fornicatus of the opposite hemisphere, slightly smaller just above the corpus callosum and 7.2 cm. from the anterior end of the hemisphere (see Fig. 4); the third and fourth about equal in size, located at the same distance from the anterior end of the right hemisphere—8.7 cm.—one in the optic thalamus and one just beneath the gray substance of the cortex (see Fig. 5), and the fifth and sixth lesions in the cerebellum resembling in some respects the large lesion first shown (Fig. 1). These cerebellar lesions (see Figs. 6 and 7), larger than any in the cerebrum, are located in the posterior part of the cerebellum and centrally. One of these is 15 by 11 mm. in the longer diameters of the flat surface exposed and located in the white substance between the two dentate nuclei above the uvula (Fig. 6). When this nodule was sectioned a little more posteriorly (4 mm.) a second lesion in the gray substance of the cerebellar cortex was revealed (see Fig. 7).

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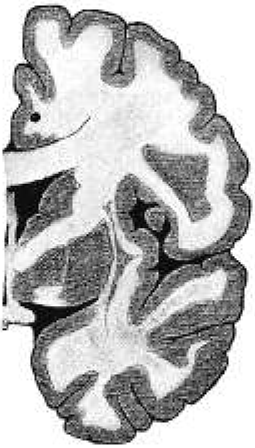
[4] Full details will be published in connection with Case 8, in the forthcoming volume of Reports from Cook County Hospital.



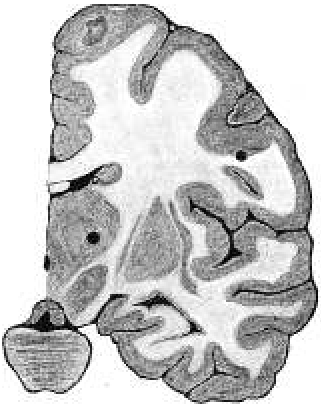
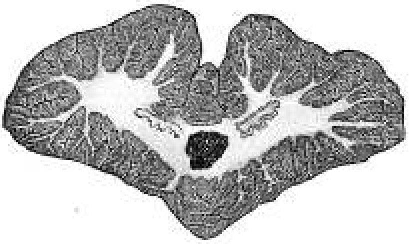


FIG. 4. Illustrating the size of the lesion in the gyrus fornicatus. Posterior surface. A segment made by sectioning the right hemisphere 7.2 cm. behind the anterior end.

FIG. 5. The posterior surface of a segment of the right hemisphere 8.7 cm. from the anterior end, illustrating the location and relative size of the blastomycotic nodules.

After these six separate lesions were found by the seventeen frontal sections mentioned, the entire brain was further subdivided by twenty-four more frontal sections, some of the thicker segments resulting from the first sectioning being divided twice. In consequence of the added surfaces exposed eight additional foci were found. For the most part these were all small and quite superficial, located at the bottom of sulci, in the gray cortex or at the junction of the cortex and white substance and all but two in the right hemisphere. They were situated as follows: 15 mm. behind the anterior end of the right hemisphere a nodule 2 mm. below the pia of the frontal lobe; in the section opening the very tip of the anterior horn of the lateral ventricle of the right hemisphere a nodule 1 mm. in diameter on the outer edge of the cortex of the gyrus frontalis inferior where it borders the Sylvian fissure; a nodule in the gyrus fornicatus 36 mm. behind that indicated in Fig. 4 and 3 mm. above the corpus callosum; a circular nodule 2 mm. in diameter in the gray cortex of the right hemisphere in a section bisecting the chiasma; a nodule 2 mm. in diameter, circular, just beneath the pia at the bottom of the sulcus between the gyri temporales medius et inferius; a circular nodule 2 mm. in diameter and 2.5 cm. from the surface at the junction of the gray and white substance in a section of the right hemisphere 11 cm. behind the anterior end; a nodule 1 mm. in diameter, 6 cm. in front of the posterior end of the right hemisphere at the bottom of a sulcus 6 mm. in depth extending upward from the inferior surface of the occipital lobe, and just below the posterior end of the lateral ventricle; a nodule 2 mm. in diameter 3 cm. in front of the posterior end of the right hemisphere in the gray cortex of the occipital lobe and lastly one 2 mm. in diameter 2.5 cm. in front of the posterior end of the left hemisphere at the junction of the white with the gray cortex of the outer surface of the occipital lobe.[5]



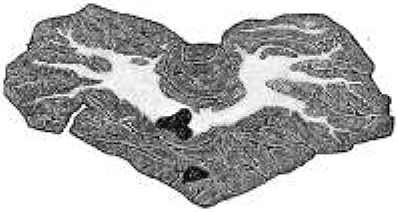


FIG. 6. Large nodule in the posterior and central portion of the cerebellum. Posterior surface of a vertically sectioned segment.

FIG. 7. Anterior surface of a vertical section 4 mm. behind that shown in Fig. 6. The lower of the two lesions is the continuation of the large lesion illustrated by Fig. 6.

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[5] The organisms are present in sections made from several of the lesions and the histological changes correspond to blastomycoses.

In their dissemination, color and occasional location in the pia these more minute blastomycotic nodules have some points of similarity to the pial miliary lesions of tuberculous meningitis. With certain features of resemblance between the lesions of blastomycosis of the central nervous system and both the large "solitary tubercle" and the minute discrete miliary tubercle, it will not be surprising if in future postmortem examinations a diffuse fibrino-purulent blastomycotic meningitis is observed in instances of systemic infection. Such a prediction seems warranted for the additional reason that the process results in a liquefaction necrosis not infrequently, the subcutaneous nodules for example developing into abscesses quite regularly.

(The drawings for which the illustrations 2 to 7 inclusively, are reproductions, were kindly made for me by Mr. Elias, by first sketching the outlines in ink, natural size, on a glass plate laid over the sections and by transillumination, transferring to paper; consequently the relations of size and position have been accurately followed.)